INFLUENCE OF AN AIR FLOW IN OSU CALORIMETER ON THE TEST DATA

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In the report will be submitted and discussed the results of researches of influence of air flow rate through OSU calorimeter on a calibration factor and next parameters of the heat release rate of the tested materials: total release heat during the first two minutes of test, maximum of heat release rate and time of its reaching.
Pursuant to the requirements of the normative documents (FAR-25 USA, ? ? -25 Russia, etc.), the items of passenger cabins of airplanes should correspond to the requirements of point 25.853 on a fire safety, including to the requirements on heat release (Appendix F, Part IV). In the normative documents is specified, that the tests should be conducted at air flow through the device 0,04 m^3/c. The deviation from allowable consumption of air at realization of tests should not exceed $\pm$ 5 %.
The requirements to persistence of feed rate of air through the device during experiment (calibration and test) can not be challenged, because the air flow influences an actual calibration factor of the device, and with the purposes ensuring reproducibility of the data, this value should be a stationary value during all experiment.
The aviation materials during combustion release a low heat, and consequently, consume a low quantity of oxygen, therefore necessity of supply of a great flow of air in the device (10 l/s in a environmental chamber) is not justified. In the given work was investigated the influence diminished (up to 1/5 from nominal) air flow on a calibration factor and registered parameters of heat release rate.
During combustion of materials, pursuant to the literary data, at consumption 1 g of oxygen on the average selected 12,72 kDj of heat. Therefore at combustion of a sample of the standard size 150x150 mm with heat release up to 65 kW/m^2 will be consumed no more than 0,115 g of oxygen per one second. At a standard condition through the device is flowed 40 l/s, and through a environmental chamber passes 10 l/s of air, that makes 3 g of oxygen per one second. Thus, at tests with a standard air flow, will be spent no more than 4 % of oxygen of air of a environmental chamber for combustion of a sample and about 1,6 % of oxygen for combustion of methane in top and bottom ignition burners. Hence, the concentration of oxygen in air of a environmental chamber decreases with 21 up to 19,5 %, that is extremely unsignificant.
Executed experiments on calibration of the equipment have shown, that with decreasing of air delivery from nominal up to 1/3 its, value of the calibration factors is continuously reduced, at the further decreasing of an air flow from 1/3 up to 1/5 from nominal its decreasing occurs more sharply.
In the executed experiments on standard samples (Standard core panel) given by Technical Center FAA USA, was shown, that at application low flows of air (up 1 to 1/2 from the standard), time of maximum of the heat release rate unsignificantly increases, and the value of peak and total of allocated heat remains without changes. At the further decreasing air flow up to 1/5 from the standard (8 l/s) the value of peak is essentially reduced, he becomes more rounded, total released heat in the first two minutes of test also decreases.
Thus, the decreasing of quantity of given air from 1 up to 1/2 nominal does not render negative effect on registered parameters of heat release rate.